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EMPIRICAL APPROACHES TO THE PROBLEM OF SPACE PERCEPTION

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Space perception or, more specifically, the perception of spatial attributes of stimulating objects, represents a basic form of human and animal behavior. Spatial characteristics of objects are usually the result of combined data obtained simultaneously through a number of different sensory modalities. This coöperation of the senses has been regarded by some as natively endowed and present at birth, and by others as the product of experience or conditioned behavior. It will be readily apparent that this nativism-empiricism controversy with respect to space perception is but a specific reflection of the more general problem of the relative influence of hereditary and environmental factors in behavioral development.

The literature on this question is both extensive and varied, ranging from purely philosophical speculation regarding the nature of an hypostatized conceptual construct ("Space") to concrete experiments on the conditioned acquisition and development of particular spatially coördinated reactions. Needless to say, it often shows an utter confusion between theory or hypothesis and observed fact, and at times indicates a certain amount of wishful thinking.

This problem of the rôle and coöperation of various sensory modalities in space localization can be attacked from a number of different angles, and data of varying degrees of relevancy and objectivity can be gleaned from several different fields. Certain of these methods appear to be particularly well adapted to specific problems, whereas others are of more general application. The very complexity

of the phenomena of space localization has at times forced psychologists to resort to particular types of subjects for their experiments, as is illustrated by data obtained on infrahuman animals, human infants, human subjects reared in widely differing cultures, and psychopathological human subjects. At other times careful experimental analysis of the various immediate intrasensory cues seemed to offer the best approach. On still other occasions, pertinent observations were effected in the case of subjects with permanent central (neural) or peripheral (sensory) physiologico-anatomical defects, or with subjects in whom similar temporary defects were produced experimentally. Evidence from recovery from congenital sensory deficiency, or from successful therapy in cases of sensory defects, has also yielded valuable material. Finally, important data have been obtained from immediate and temporary as well as from prolonged experimental sensory disorientation, both when such disorientation was primarily intrasensory or limited to a single modality, and when it was intersensory and sensorimotor.

The following summary is an attempt to present, in outline form, the more outstanding empirical approaches which have been made to the problem of spatial localization. To the writer's knowledge, these lines of evidence have never been summarized within the confines of a single book or article.[1] There are many intrinsic problems involved in any attempt to classify a maximum of diverse experimental approaches into a minimum of logical categories. The resulting classification will necessarily be incomplete on many points and will also falsify to a certain extent. In the present case, for example, many types of material indirectly related to space perception, such as data on illusions, interference and adaptation in mirror-drawing, card sorting, cases of inverted writing and drawing, etc., have been purposely omitted; only approaches comprising an empirical analysis of some direct phase of space perception have been included. In the following classification, moreover, logical relationship has been at times sacrificed for pragmatic ends; and overlapping will be found among certain categories, such as numbers 2, 5, 12, 13, and 14. On the whole, however, it is hoped that the advantages to be derived from such a summary will outweigh the inherent classificatory defects. Finally, it should be repeated that the following outline is

[1] Perhaps the best single summary of portions of the general field of space perception has been made by Carr (13), although later material on visual and auditory localization has been presented by Ewert (21, 22), Higginson (40), Pearce (65), Willey, Inglis, and Pearce (105), and Young (110).

not intended as a complete summary of the extensive work on the genesis and conditions of spatial localization, but rather to indicate the variety of *approaches* which are available or possible. Certain of these lines of evidence are well developed, others have as yet received but slight consideration, and still others will doubtless be discovered in the future.

1. Evidence from *memory.* Yields no pertinent data, since the origin of intrasensory adaptation and intersensory coöperation precede the earliest retrospectively remembered spatial acts. Cf. Carr (**13**).[2]

2. Behavior observations of the genesis and conditions of spatial orientation in *infrahuman animals.* Cf. Foley (**24**, **25**, **26**), Lashley (**57**), Lashley and Russell (**58**), Richardson (**73**), Russell (**77**), etc.

3. Similar behavior observations of *human infants,* particularly with regard to the genesis and conditions of localizing reactions to the various sensory attributes of objects. Cf. Blanton (**8**), Carr (**13**), Gesell (**32**, **33**), Gesell and Thompson (**34**), Kuroda (**54**), Pratt, Nelson, and Sun (**71**), Sherman and Sherman (**81**), Updegraff (**95**), etc.

4. Similar observations of *different human cultures,* drawn from the fields of anthropology, ethnology, and comparative, differential, "racial," and social psychology: a comparison of spatial localization in humans reared under vastly different stimulational conditions. Cf. Anastasi (**1**), Chou (**14**), Dégallier (**17**), Klineberg (**52**), Rivers (**74**), Shen (**79**), Sherif (**80**), etc.

5. Experimental evidence on normal human subjects with regard to the *various intrasensory factors in the perception of spatial attributes such as distance, direction, size, shape, and motion.*[3]

[2] Carr (**13**, p. 9) states: "It is obvious that the various senses have coöperated successfully as far back as we can remember. No one can recall a time in which auditory, visual, and tactual aspects of an object were spatially unrelated."

[3] Since the literature in this field is so extensive and well known, no references will be cited.

To illustrate:

A. *Visual perception*

1. Methodology: use of binocular and monocular observation and perimetry, free stereoscopy, prism stereoscope, mirror stereoscope, double negative method, anaglyphs, telestereoscope, iconoscope, pseudoscope, etc.

2. Results: data on the individual, relative, and combined effectiveness of

a. Distance cues:

(1) Monocular retinal factors: nonpatterned.

(a) Size of retinal image.

(b) Intensity of retinal image.

(c) Clearness of outline and visibility of details.

(2) Monocular retinal factors: patterned.

(a) Interception or superposition.

(b) Shadows.

(c) Distribution of light and shade.

(d) Atmospheric haze.

(e) Relation of object to observer and to sky line.

(f) Pattern differentiation (filled *vs.* unfilled space, etc.).

(g) Accessory aids: relative movement of near and far objects, etc.

(3) Binocular retinal factors.

(a) Crossed and uncrossed images.

(b) Binocular parallax: horizontal disparity of retinal patterns.

(4) Convergence.

(5) Accommodation.

b. Direction cues:

(1) Retinal position of stimulus.

(2) Visual relation to the body.

(3) Head position or posture.

(4) Eye position or posture.

B. *Auditory perception*

1. Methodology: monaural and binaural localization and perimetry; plugging; binaural localization with acoustically detached pinnae, as with 2 trumpets on the same side of the head; binaural localization with acoustical

transposition of the ears by means of pseudophones; binaural localization by means of tubular conduction from a single source object; binaural localization of a phantom produced by 2 similar or different source objects differently located but vibrating simultaneously.

2. Results: data on the individual, relative, and combined effectiveness of
   a. Distance cues:
      (1) Intensity.
      (2) Tonal complexity.
      (3) Pitch.
      (4) Binaural parallax.
      (5) Binaural intensity differences.
   b. Direction cues:
      (1) Monaural.
         (a) Tonal complexity(?).
      (2) Binaural.
         (a) Intensity ratio.
         (b) Tonal complexity ratio.
         (c) Initial stimulation time ratio.
         (d) Phase ratio.
         (e) Angle of incidence(?).
      (3) Non-auditory signs.
         (a) Stimulation of cutaneous nerves in face, cheeks, and pinnae(?).
         (b) Stimulation of semicircular canals via bone conduction(?).
      (4) Accessory or supplemental aids.
         (a) Head movements.
         (b) Vision.
         (c) Inferential knowledge.

C. *Cutaneous perception*

1. Methodology: perception of location of points on body surface and of extensity in 2 dimensions, by means of tactile stimulator, adjustable calibrated two-point aesthesiometer, etc.

2. Results: data on
   a. Error of localization: local sign.
   b. Perception of extensity: two-point threshold.

D. *Static or labyrinthine perception*

1. Methodology: physical stimulation by means of rotation and tip table, galvanic stimulation through the head, caloric stimulation of the ear, etc.
2. Results: introspective reports, localizing judgments with reference to probable body position at any moment, objective records of reflex adjustments resulting from vestibular stimulation, etc.

E. *Kinesthetic perception*

1. Methodology: introspective reports, localizing judgments, and objective experiments on kinesthetically perceived sensory qualia of objects and relations, etc.
2. Results: data on the effectiveness of kinesthetic strain as a cue in the perception of distance, direction, shape, weight, active and passive movement, etc.

6. Observations of *abnormal (psychopathological) human subjects,* as in cases of hypophrenia, schizophrenia, manic-depressive psychoses, paranoia, psychoneuroses (hysteria, neurasthenia, psychasthenia), epilepsy, alcoholic, syphilitic, and traumatic disorders, etc. (Cf. Curtis (**15**), Rosanoff (**75**), etc.

7. Evidence from *central anatomico-physiological defects,* such as brain lesions, extirpations, etc. Cf. Gelb and Goldstein (**28, 29, 30, 31**), Goldstein (**36**), Goldstein and Rosenthal-Veit (**37**), etc.

8. Evidence from *permanent structural sensory defects,* as in

A. *Congenitally blind subjects.*

B. *Subjects monaurally or binaurally deaf (total) or defective.* Cf. Angell and Fite (**2**), Feree and Collins (**23**), Starch (**82**), etc.

C. *Subjects experiencing binaural dissociation, monaural double hearing, etc.* Cf. Stumpf (**90**), etc.

9. Evidence from *temporary experimentally produced sensory defects,* such as

A. *Monocularly or binocularly blindfolded subjects.* Cf. Cutsforth (**16**), etc.

B. *Subjects rendered monaurally or binaurally deaf* by various forms of plugging. Cf. Feree and Collins (**23**), Hocart and McDougall (**42**), Starch (**82**), Young (**108**), etc.

10. Evidence from *cases of acquisition of sensory capacity late in life,* as in subjects born blind and subsequently recovering vision by means of an operation for the removal of congenital cataracts. Cf. Bourdon (**9**), Dennis (**18**), Kaz (**47**), Kuroda (**55**), Latta (**59**), Miner (**63**), Moreau (**64**), Senden (**78**), Vogt (**98**), etc.

11. Evidence from *therapy to correct disturbances in space localization in cases of human visual defects,* as in

A. *Strabotic*[4] *patients,* the defect being corrected by means of hygienic, orthoptic, refractive, or surgical techniques. Cf. Hartridge (**38**), Landolt (**56**), Stevens (**83**), Swanzy (**91**), etc.

B. *Homonym hemianopsic*[5] *patients,* the defect being corrected by the use of prism- and mirror-spectacles. Cf. Best (**5**), Braunschweig (**10**), Igersheimer (**45**), Metzger (**62**), Strebel (**89**), Wilbrand and Saenger (**104**), etc.

[4] Carr (**13**, p. 176) defines strabismus as "a condition in which the visual axis of one eye cannot be directed at the fixated object, and hence the object cannot stimulate both foveæ simultaneously. If it stimulates the fovea of the left eye, it necessarily stimulates a parafoveal area in the right eye, and vice versa." Diplopia, however, is absent in most cases, although the subjects can usually be trained to detect the double images. There are 2 kinds of strabismus: paralytic and concomitant, and 3 types of each: convergent, divergent, and vertical.

[5] Since, as Ewert (**22**, p. 107) points out, a rehabilitation of active orientation mediated through the blind areas has been structurally impossible, "attempts have been made to reflect the visual field, which in hemianopsia falls upon the blind area, so that it again falls upon the normal visual area. Although this brings about a distortion and an overlapping of objects in the visual field, it nevertheless furnishes the intact portion of the retina the necessary stimulation for eye-fixations in all directions and thus enhances, for example, the eye-hand coördinations."

Most investigators, using prisms, have deflected the visual field 5–10° toward the blind side, causing certain objects in the visual field, which would otherwise fall in the blind area, to be focused upon the normal visual area. Igersheimer (**45**) has employed mirror-spectacles to reflect the entire visual field falling upon the blind area of total hemianopsia so as to focus it upon the normal retina, resulting in 2 projected overlapping non-identical visual fields which must be coördinated with practice.

12. Experimental evidence from *immediate temporary intrasensory*[6] *disorientation,* as from *inversion of the landscape,* by inverting the head or by means of mirrors. Cf. James (46), Washburn (101), etc.

13. Experimental evidence from *prolonged intrasensory disorientation,* such as *adaptation to prismatically induced metamorphopsia.*[7] Cf. Gibson (35), Wundt (107), etc.

14. Experimental evidence from *immediate and prolonged intersensory and sensorimotor disorientation,* induced by

A. *Refracting lenses, prisms, and reflecting mirrors in the visual field,* producing *visual inter-sensorimotor inversion.*[8] Cf. Brown (11), Ewert (20, 21, 22), Foley (24, 25, 26), Lipps (60), Peterson (68), Stratton (84, 85, 86, 87, 88), Wooster (106), etc.

B. *Pseudophones, sound reflectors, and electric microphones in the auditory field,* producing binaural transposition of sound. Cf. Banister (3), Klemm (50, 51), Pohlman and Kranz (70), Thompson (92), Urbantschitsch (96), von Hornbostel and Wertheimer (100), Willey, Inglis, and Pearce (105), Young (108, 109, 110), etc.

C. *Anesthetics in the cutaneous senses.*

D. *Physical and chemical stimulation of the static sense,* as by rotation, ear douching, etc., producing facilitation and inhibition of vestibular reflexes. Cf. Kleijn and Magnus (48, 49), Travis (93), Travis and Dodge (94), Van der Hoeve and Kleijn (97), etc.

[6] Intrasensory, because its effects are primarily limited to the visual sense department.

[7] Involves merely the stability of the visual pattern.

[8] Such inversion effects are occasioned through active localization, and result, as Ewert (21, p. 543) has pointed out, from antagonistic intersensory guidance, from antagonism between eye-movements of ocular and vestibular origin, and from antagonistic conceptual habits showing inter-symbolic-motor conditioning. The problem of upright vision involves active inter-sensorimotor localization, and hence should not be confused with the predominantly intrasensory effects which involve primarily the mere stability of the visual pattern.

Whereas these experiments have shown the effect of *spatial* inversion, Hilzensauer (41) has investigated the effects of *temporal* inversion of both visual (normal and reversed movie films) and auditory (phonograph records of reversed music) phenomena.

E. *Drugs* (hashish, mescal, etc.) *in the organic senses,* producing pharmaceutically aroused sensory and organic hallucinations. Cf. Klüver (**53**), etc.

F. *Temporary or permanent alterations of certain kinesthetic sensations,* as by muscular transplantation, as well as opening or raising the bite in cases of dental malocclusion, occlusal unbalance, abrasion, overbite, etc. Cf. Foley and Stein (**27**), etc.

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REPORT OF A SURVEY CONDUCTED BY THE MOTION PICTURE COMMITTEE

BY W. L. VALENTINE
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Since 1933 the American Psychological Association has had a Committee on Motion Pictures and Sound Recording Devices in Instruction of Psychology. This Committee has encouraged the use of films in both instruction and research by serving as a clearing-house for requests for information which have from time to time come to its members individually. Annually since its appointment it has made a report at the business meeting. It has also sponsored a round table on the use of motion pictures which for the past several years has been a part of the program of the scientific sessions of the Association. It helped to work out the present plan for handling films during the annual meeting whereby they are concentrated in a one-evening exhibition.

Late in 1936 it became possible to secure a small grant from the American Council on Education which also has a Film Committee. The grant could be used to make a survey of the extent to which films are used in psychology. A questionnaire for the survey was prepared by the A. P. A.'s Film Committee but the American Council defrayed all expenses in connection with its distribution and with the tabulation of the returns.

These returns were reported in the film round table at the Minneapolis meeting of the Association in 1937. About 99% of the people who returned the questionnaire requested a summary of the findings and since that time there have been frequent inquiries from other people so that we feel that there is sufficient interest to warrant an abbreviated report of the principal findings.

There were 296 questionnaires distributed. They were designed to obtain information on (1) the extent to which universities and colleges are equipped to use films; (2) the use that has already been made of this equipment; (3) the plans for future use and some expression of attitude on the part of the users as to the advisability of continuing a development which is already under way. The Com-

mittee also hoped to discover some useful films that were not widely known at the present time, but the patience necessary to produce exact titles and other technical information was apparently asking too much of its informants. A better way to secure such information had already been employed by Lester Beck, who reported his findings in the BULLETIN [1]. The attention of this report will be confined to the 3 rubrics mentioned above.

The relatively small number of questionnaires distributed was part of the plan to keep the expense of tabulating and summarizing as low as was consistent with accuracy and freedom from sampling error. There were 156 different institutions represented in the 201 returns [2]. The discrepancy between the number of questionnaires returned and the number of institutions reported is accounted for in the fact that many of the larger institutions are represented from 2 to 5 times. From Yale, for example, returns were received from the department of psychology, the Institute of Human Relations, and the laboratory of psychobiology. The total number of institutions or areas represented is 173. The practice in various areas of some of these institutions is somewhat different. There were a large number of items in the total questionnaire which were omitted by some people, and in each instance the percentage replying in a certain way has been based upon the number of people who answered the item. There is unanimous agreement that motion pictures are an asset in classroom teaching.

PROJECTION EQUIPMENT

Ninety-one per cent of the 173 institutions or areas represented in the survey have lecture rooms which can be darkened during the day while 88% are equipped to show motion pictures. That even 9% of the colleges and universities of this sample are without even the prerequisite dark room is a matter of some concern to those of us interested in the potentialities of instruction by means of films. The 12% reporting a complete lack of motion picture equipment is made up entirely of very small colleges, most of them located in the South.

Of those owning equipment, 92% possess the sixteen-millimeter size, 35% have thirty-five-millimeter silent equipment, 23% report

[1] Beck, L. F., A Review of Sixteen-Millimeter Films in Psychology and Allied Sciences. *Psychol. Bull.*, 1938, **35**, 127–169.

[2] Several people collaborated in filling out a return from a single institution where the practice was uniform throughout the department so that the actual percentage of return is somewhat higher than the number 201 indicates.

sixteen-millimeter sound and 18% have thirty-five-millimeter sound equipment available to them. Only 7% have eight-millimeter equipment.

In 37% of the institutions or areas which are equipped to show films, the projection equipment is owned by the psychology department. In 63% of the cases it is owned and controlled by agencies outside the department. In some of these instances there is a central visual education department which controls all visual equipment, and in other instances the equipment is owned jointly with another department. In several cases, the equipment is owned privately by a psychologist who uses it in his own classes.

Of the institutions which are not at present able to use films, 33% indicate that they are definitely considering the purchase of projection equipment, *but 50% of them are definitely not considering the purchase of such equipment.* The remainder are undecided. Ninety-two per cent of the 201 persons who replied indicate that they intend to use existing films when their budget permits and 8% report definitely, and in some instances caustically, that they do not intend to use *any of the existing films.*

Camera Equipment

Fifty-five per cent of the 156 institutions report that they have cameras and photographic accessories available to make motion pictures and 45% report that they are not so equipped. These numbers are to be compared with the 88% who own projection equipment. The sixteen-millimeter equipment is the most popular camera size. It is owned by 80% of the equipped institutions. Only 18% have thirty-five-millimeter cameras and 4% have eight-millimeter cameras. Only 29% of the departments of psychology own their own camera equipment in comparison with 37% who own their own projection equipment. Here again, central departments of visual education and photography control the camera equipment. In a few instances camera equipment is also privately owned. Twenty-six per cent of the institutions report that the purchase of camera equipment is under consideration. This includes those institutions which are not already supplied as well as additions to the equipment of institutions that are. In about half of these instances the department of psychology plans to do the purchasing. The other potential purchasers are reported to be the various departments except psychology, and the institutions themselves. Most of this new equipment will be in the sixteen-

millimeter size. There is some demand for sixteen-millimeter sound equipment, and only one institution is considering the purchase of eight-millimeter equipment.

Accessories

Although a camera and a projector are the two most important and expensive items of equipment necessary for making and using films, the film craftsman soon finds himself in need of accessory equipment such as an exposure meter, a film editing device, portable actinic lights and supplementary lenses, masks, etc. As in the miniature-camera field, many accessories offered by manufacturers are gadgets rather than items of real merit. Consequently an unbiased bulletin which would evaluate the items of equipment now available would be of value to about 90% of the people who took part in this survey. They also feel that such a bulletin should treat exhaustively of the technique of making an educational film—how to make titles, how to edit, the relative values of negative and reversal film, how to reproduce figures and diagrams, as from textbooks, how to make animated drawings, how to illuminate a scene. Directions on how to plan films from the very beginning to the final edited product should be included.

Factors Antagonistic to the Use of Films

The mechanics of threading a projector and caring for film appeared to 30% of the informants to be factors of importance in preventing the widespread use of films. Seventeen per cent admitted that these factors prevented the use of films for the informant himself, while 42% felt that although these factors did not operate in preventing the person himself from using films, nevertheless he knew others in psychology who were so mechanically inept that the use of films would be limited.

Films were held to be of most value in general psychology and of least value in statistics, with the other divisions of psychology represented in order: child, abnormal, animal, genetic, industrial, educational, clinical, and social. This listing could be interpreted as indicating the relative potential demand for films in these classifications of subject-matter. A study of the existing films such as Beck has made indicates that the demand is not being met. There are no satisfactory films in the abnormal field, yet 81% of our respondents believe that films could be used in this area to a considerable advan-

tage. In child psychology we are fairly liberally supplied at the present time. In industrial, educational, social, and clinical psychology good films would probably find an immediate acceptance.

Relative Effectiveness of Film and Demonstration

The latter part of the questionnaire was aimed at getting expressions of opinion on the relative effectiveness of the film compared with an actual demonstration and some related topics. Thirty-seven per cent of the informants favor films instead of actual demonstration. Forty per cent favor the demonstration, and 23% are either undecided, believe the 2 should supplement each other, are of equal value, or feel that a generalization on the subject cannot be made. The form of presentation to be used, they feel, depends entirely upon the specific subject-matter involved. A majority of those favoring actual demonstrations, nevertheless, believe that a film is of value especially in large classes but they hold that it is *generally* less effective and cannot replace an actual demonstration. They believe that it may be more convenient to use a film and may be less expensive. Some of the more frequent reasons for preferring actual demonstrations are that the psychology films have been inadequate from the technical photographic standpoint. This position might indicate that when better films are available, these people will change their opinion in connection with this item. But there is still a fairly large number who would continue to feel that attention can be maintained better by the use of an actual demonstration, that a demonstration is more motivating for students, and considerably more real; that conciseness and emphasis of the important points can be better controlled; that there is more time available to explain the experimental conditions surrounding the demonstration and that the explanation which accompanies the demonstration can better be coördinated with the experiment under observation than could ever occur in a film. Of these opinions only those relating to conciseness, emphasis, and so forth, probably confuse the existing films with an ideal film. Another reason why a demonstration is to be preferred to the film is that students generally approach a film with the expectation of being amused for its duration. This is held not to be generally encountered in an actual demonstration. In summarizing the various comments that were made, it was noticed that those who prefer an actual demonstration present far fewer reasons for their preference than are presented by those who prefer films. The occurrence of a

simple statement of preference is far more frequent in the demonstration-preferring group.

Among the reasons why people believe a film is better than a demonstration are: It makes items available which ordinarily would not be possible to demonstrate in a classroom. The film can be shown in a given length of time while the time required for a demonstration is more or less unpredictable. The time that is devoted to the film is felt to be more effective per unit of time used. The film can be repeated any number of times with no increase in cost. The certainty of the outcome of an experiment made before the camera is held to be an advantage by a considerable number of people. The restriction of attention to the significant items in a demonstration can be handled by means of the close-up technique. The use of animated diagrams and stop-action scenes and slow motion are obvious advantages which were frequently expressed. Saving of time in the setup of the apparatus was mentioned several times. The compression of hours, weeks, or months into a short-time sequence is an advantage in some kinds of film demonstrations and the fact that demonstrations by way of the motion picture can be attempted by the relatively unskilled in apparatus technique was thought to be a cogent reason for the use of the films on the part of several different people. On the other hand, the existing films were criticized because of poor technical conditions, such as bad projection, out-of-focus prints, and jerky movements. One critic said that all of the existing films show that film making is really too specialized a task for the ordinary psychologist to undertake and that it should be done only after careful planning and coöperation between psychologist and trained technicians. In silent films the scarcity and brevity of subtitles and the lack of integrative material have been held to stand against an effective use of the films that are available. Certain films were criticized in that they become monotonous through stupid repetition and the prolongation of a certain scene. Poor photographic composition has detracted from film effectiveness. The whole frame has very frequently not been utilized since the significant action goes on in only one small part of the picture. The editing of the films has frequently been faulty in that the material has been arranged poorly in the first place and, secondly, the films generally lack the one central idea that several people think would be an advantage. This lack of organization leads to the use of descriptions, such as "newsreel-like," and the feeling on the part of some users that students get from films what the

average reader gets from the headlines of a newspaper. They hold that the understanding is generally very superficial.

As a result of this survey, if our data are free from sampling error, we may conclude that approximately 88% of the psychology departments and institutes engaged in instruction are making some use of the existing films in psychology and related sciences. Some institutions use only one film, others use a score or more. Almost one-half of the departments not equipped for projection now plan to provide themselves with projectors in the near future. The other half are not interested in developing this phase of their activities. The fact that the sixteen-millimeter film is now considered standard in the educational field puts the use of such equipment within the reach of all. It might also be concluded that a department that does not own or have available to it a sixteen-millimeter projector is distinctly underequipped.

The lack of photographic training on the part of our film craftsmen in psychology has prevented a wider use of films. The technical excellence of theatrical films has made us impatient with amateurish efforts. As a consequence, the greatest need at the present time lies in the field of production. This production should not be attempted until adequate financial support is obtained to permit careful planning and coöperation by competent psychologists and motion-picture technicians.

I interpret at least part of the present dissatisfaction with instructional films to be caused by a confusion between the instructional and research film on the part of both the makers and the users. The first films to be used for instructional purposes in psychology were simply strips of film which had been used to record research data. They were not designed by the maker to be used by anyone else. They were "raw data," so to speak, without the editorial organization or the extended implication that has become essential in instructional films. When used by other people who are not able to supply an interpretation background for understanding, they are meaningless and stupid.

A SURVEY OF COURSES IN PSYCHOLOGY OFFERED BY UNDERGRADUATE COLLEGES OF LIBERAL ARTS

BY EDWIN R. HENRY [1]
New York University

This survey was conducted with the intention of securing the answers to 2 questions: (1) What is the plan of instruction with regard to lecture and laboratory in the beginning course in psychology? (2) What advanced courses in psychology are offered in undergraduate liberal arts colleges? The information used in the attempt to answer these questions was obtained from an examination of the regular catalogs issued by 157 colleges of liberal arts scattered throughout the country.

The results are presented for 3 groups of colleges as follows: [2]

Group A. Colleges Having Enrollments of 1,500 or Over (N=48)

Brigham Young	Notre Dame	U. of Kentucky
Brooklyn College	Ohio State	U. of Michigan
C. C. N. Y.	Ohio Wesleyan	U. of Minnesota
Columbia University	Pittsburgh	U. of Missouri
Cornell University	Princeton	U. of Nebraska
Dartmouth	Southern Methodist	U. of North Carolina
George Washington	Stanford	U. of Oklahoma
Harvard	St. John's	U. of Tennessee
Howard	Syracuse	U. of Texas
Indiana	Tufts	U. of Virginia
Iowa	U. of Alabama	U. of Washington
Kansas	U. of California	U. of West Virginia
Long Island	U. of California at L. A.	U. of Wisconsin
New York University	U. of So. California	Wayne (Detroit)
Washington Square College	U. of Chicago	Western Reserve
	U. of Colorado	Yale
Northwestern	U. of Illinois	

[1] The writer acknowledges with gratitude the assistance of Miss Mary Lurie.

[2] The names and enrollments of the colleges were obtained from the *College Blue Book*. In the case of universities, only the liberal arts colleges are included; or if the department of psychology is not part of the liberal arts college, only those courses listed in the liberal arts catalog, or credited by it, are included.

Group B. Colleges Having Enrollments of 1,000 to 1,499 Students (N=29)

Arkansas A. & M. Dist. No. 1
Baylor
Boston College
Brown
Bucknell
Butler
DePauw
Fordham
Holy Cross
Montana
New York University University College
Ohio
Oklahoma City
Rice Institute
Rochester
Texas Christian
Tulane
U. of Arizona
U. of Cincinnati
U. of Denver
U. of Georgia
U. of N. Hampshire
U. of Omaha
U. of Oregon
U. of Pennsylvania
U. of Utah
Vanderbilt
Washington
William and Mary

Group C. Colleges with Enrollments of 500–999 Students (N=80)

Akron
Allegheny
Amherst
Antioch
Bates
Birmingham Southern
Boston U.
Bowdoin
Buffalo
Catholic U.
Centenary (La.)
Colby College
Colgate
Cornell College
Creighton
Davidson College
Dayton
Dennison
Detroit
Dickinson
Drake
Duquesne
Earlham
Emory
Florida
Franklin and Marshall
Furman
Geneva
Gettysburg
Grinnell
Grove City
Idaho
Lafayette
Louisiana State
Loyola (Ill.)
Macalester
Maine
Manhattan
Marquette
Maryland
Maryville
Miami
Mississippi
Morningside
Mt. Union
Muskingum
Nevada
North Dakota
Occidental
C. of Pacific
Park
Phillips
Providence
Puget Sound
Rutgers
San Francisco
Simpson
South Carolina
Southwestern
St. Lawrence
St. Mary's (Texas)
St. Thomas (Pa.)
Swarthmore
Temple
Tulsa
Union
Union College (N. Y.)
Vermont
Villanova
Wake Forest
Washburn
Washington and Lee
Wesleyan
Wheaton
Whitman
Whittier
Wichita
Wittenberg
Wooster
Wyoming

Results

I. Nature of the Elementary Course

Table I indicates the general practice of instruction in elementary psychology:

TABLE I

Instructional Setup of Elementary Courses

	Total Colleges	Offering One or More Elementary Courses in Psychology		With Elementary Course as College or Group Requirement		Requiring Laboratory with Elementary Course		Offering Parallel Elective Laboratory Course		Offering Only Lecture Course	
	No.	No.	%	No.	%	No.	%	No.	%	No.	%
Group A	48	47	97.9	7	14.6	11	22.9	33	68.7	4	8.3
Group B	29	29	100.0	9	31.0	6	20.7	18	62.1	5	17.2
Group C	80	80	100.0	29	36.3	9	11.3	42	52.5	23	28.8
Total	157	156	100.0	45	28.7	26	16.6	93	59.2	32	20.4

In Group A, the only college not offering an elementary course (or any course) in psychology was St. John's University. The 11 colleges requiring laboratory as a part of the elementary course were Ohio Wesleyan, Brooklyn College, Brigham Young, C. C. N. Y., Iowa State, Michigan, North Carolina, Ohio State, California, Indiana, and Kansas University. The 4 colleges not offering a parallel elementary course for election (excepting the 11 requiring laboratory as a part of the elementary course) were Howard, Alabama, Texas, and New York University—Washington Square College.

In Group B, one or more courses in psychology was offered by all 29 colleges. The 6 colleges requiring laboratory as a part of the elementary course were U. of Pennsylvania, Ohio U., Oregon, Rochester, DePauw, and New York University—University College. The 5 colleges not offering a parallel elementary laboratory course for election (excepting the 5 requiring laboratory as a part of the elementary course) were Utah, Texas Christian, Tulane, Fordham, and Holy Cross.

In Group C, one or more courses in psychology was offered by all 80 colleges. The 9 colleges requiring laboratory work as a part

of the elementary courses were Antioch, Grinnell, Idaho, Maine, North Dakota, Park, Rutgers, Tulsa, and Wooster. The 23 colleges not offering a parallel elementary laboratory course for election (excepting those requiring laboratory work in the elementary course) were:

Akron	Maryland	Union College (N. Y.)
Amherst	Morningside	Union (Ohio)
Birmingham Southern	Providence	Villanova
Catholic U.	San Francisco	Washburn
College of the Pacific	Simpson	Wheaton
Earlham	Southwestern	Whitman
Geneva	St. Mary's	Whittier
Grove City	St. Thomas	

II. Type of Advanced Instruction

Table II shows the extent of advanced laboratory instruction in general experimental psychology:

TABLE II

Laboratory Offerings in Advanced Experimental Psychology

	Number of Colleges	Offering Advanced Laboratory Instruction		Offering More than One Advanced Laboratory Course	
		No.	%	No.	%
Group A	48	17	35.4	8	16.7
Group B	29	10	34.5	3	10.3
Group C	80	9	11.3	6	7.5
Total	157	36	27.1	17	11.5

The 8 colleges in Group A offering more than one laboratory course were Chicago, Illinois, Michigan, Minnesota, New York University—Washington Square College, Pittsburgh, Stanford, Wisconsin. The 3 in Group B offering more than one advanced laboratory course were: Pennsylvania, Brown, and Oregon. The 6 in Group C offering more than one advanced laboratory course were Buffalo, Dennison, Drake, Emory, Grinnell, and Lafayette.

Table III shows the extent of instruction in advanced courses: (Courses were listed under many other titles and have been reclassified on the basis of the catalog descriptions.)

TABLE III

ADVANCED UNDERGRADUATE COURSES OFFERED BY THE 157 COLLEGES

Title of Course	Group A (48)		Group B (29)		Group C (80)		Total (157)	
	No.	%	No.	%	No.	%	No.	%
Abnormal	39	81.2	21	74.9	49	61.2	109	69.40
Adolescence	7	15.2	10	34.5	21	26.2	38	24.20
Advanced General	19	39.6	8	28.5	118	22.5	45	28.70
Applied	21	43.7	13	46.4	33	41.2	67	42.70
Business	14	30.4	7	24.9	12	15.0	33	21.00
Child	21	43.7	11	39.3	31	38.7	63	40.10
Clinical	17	37.0	10	35.7	2	2.5	29	18.50
Comparative	31	64.6	9	32.1	14	17.5	54	34.40
Differential	11	22.9	5	17.2	2	2.5	18	11.50
Educational	16	34.8	12	41.4	40	50.0	68	43.30
Exceptional Child	5	10.9	5	17.8	4	5.0	14	8.90
Genetic	10	39.6	6	20.6	14	17.5	39	24.80
History	22	47.8	9	32.1	12	15.0	43	27.40
Learning Process	17	35.4	7	24.9	7	8.7	31	19.70
Mental Hygiene	12	26.1	7	24.9	16	20.0	35	22.30
Personality	19	41.3	10	35.7	19	23.7	48	30.57
Personnel	14	29.2	2	7.1	2	2.5	18	11.50
Physiological	26	54.2	11	37.9	9	11.2	46	29.30
Religious	5	10.9	8	28.5	11	13.7	24	15.30
Research	25	52.1	9	32.1	10	12.5	44	28.00
Seminar	22	45.8	9	32.1	16	20.0	47	29.90
Statistics	18	39.1	7	24.1	7	8.7	32	20.38
Systematic	28	58.3	11	39.2	21	26.2	60	38.20
Tests and Measurements	25	52.1	18	62.1	23	28.7	66	42.00
Vocational	8	16.7	3	10.7	4	5.0	15	9.60

There were 34 other unclassified courses offered by one or more colleges in the 3 groups. In some large schools, certain courses are offered primarily for graduate students but are open to advanced undergraduates in liberal arts. This accounts for some of the highly specialized courses listed below. The titles follow:

Advertising and Selling
Aesthetics
Background of Social Sciences
Biographical Psychology
Delinquency and Crime
Psychology of Efficiency
Feelings and Emotions
Fields of Psychology
Higher Mental Processes
Honors Course
Human Adjustment
Psychology of Invention
Legal Psychology
Methodology
Mind-Body Problems
Motivation
Orthogenics
Psychology of Physical Education
Physical Research
Political
Psychology of Primitive People
Psychoanalysis
Psychological Apparatus
Psychology of Elementary or High School Subjects
Psychology of Language and Speech
Racial Psychology
Psychology for Social Service Workers
Special Senses
Study Methods
Vocational Guidance
Psychology for Writers

Three Catholic colleges gave the following courses in addition to general psychology: educational, fundamental, empirical, rational, and personality. It will be observed that 7 advanced courses (in addition to advanced experimental) were offered by 50% or more of the Group A schools. The courses were abnormal, comparative, physiological, social, systematic, tests and measurements, and research. Three of these (abnormal, social, and tests and measurements) were also given by more than half of the Group B colleges, and abnormal and social by more than half of the Group C schools. In addition, more than 50% of the Group C schools offered educational psychology. The fact that this course was offered by only 34% of the Group A and 41% of the Group B colleges may be explained by the fact that in larger colleges and universities a separate department in the school of education makes this offering. The courses offered by more than half of the colleges in any one group are shown in Table IV:

TABLE IV

COURSES OFFERED BY MORE THAN FIFTY PER CENT OF THE COLLEGES IN ANY ONE OF THE GROUPS

	Group A		Group B		Group C		Total	
	No.	%	No.	%	No.	%	No.	%
Abnormal	39	81.2	21	74.9	49	61.2	109	69.4
Comparative	31	64.6	9	32.1	14	17.5	54	34.4
Educational	16	34.8	12	41.4	40	50.0	68	43.3
Physiological	26	54.2	10	35.7	9	11.2	45	28.7
Research	25	52.1	9	32.1	10	12.5	44	28.0
Social	37	77.0	20	68.9	56	70.0	113	72.0
Systematic	28	58.3	11	39.2	21	26.2	60	38.2
Tests and Measurements	25	52.1	18	62.1	23	28.7	66	42.0

SUMMARY

Elementary general psychology is taught in all but 1 of the 157 colleges included in this survey. Approximately one-third of the schools with less than 1,500 students and 15% of the larger schools require this course for graduation.

Roughly one-fifth of the schools with enrollments over 1,000 and 10% of the smaller schools have a required laboratory as part of the elementary course; all but 32 offer a parallel elective laboratory course.

Approximately one-third of the schools in the 2 larger groups and one-tenth of the smaller colleges offer one or more laboratory courses in advanced experimental psychology.

Advanced courses are offered by every college, with 8 courses offered by more than 50% of one or more of the groups.

REPLY TO SPECIAL REVIEW OF 'TWINS'[1]

BY KARL J. HOLZINGER
University of Chicago

In the April, 1938, issue of this journal there appeared a lengthy review of our book on twins by Quinn McNemar. The review was devoted to an elaboration of 11 negative criticisms. I propose to comment briefly on the ninth point of criticism first and to deal subsequently with most of the remaining points, which seem to be open to objections.

McNemar is to be thanked for noting that Table 95 included single entry rather than double entry variances. This error, which will be corrected in the next impression of the book, does not change the values of h^2 significantly, as would be expected, inasmuch as ratios of variances are employed in the h^2 method. The change amounts to measuring variance from the zero of the scale rather than from the mean. A list of values of h^2 from single and double entry variances will be presented later.

In the first point it is stated that ". . . fraternal type twin pairs which are least alike physically and mentally are *most apt to be overlooked* . . ." (italics mine). It is then argued that this kind of selection might account for the correlations for fraternal pairs being generally greater than .50.

Now there is not much chance that the mother of twins could *overlook* the fact that they were twins even if they looked different. There is not much chance that the twins themselves did not know that they were twins. Furthermore, there is not much chance that the principals and teachers would overlook unlike appearing twins nearly always in the same grade. In short, mothers and twins and teachers get wind of the fact that twins are twins. We are therefore reasonably sure that no fraternal twins were overlooked because they did not look alike.

In point two McNemar says that the critical reader will find it difficult to decide whether or not the physical measurements were utilized in diagnosing monozygosity. This diagnosis was made by

[1] Newman, H. H., Freeman, F. N., and Holzinger, K. J., *Twins: A Study of Heredity and Environment.* Chicago: The University of Chicago Press, 1937. Pp. xvi+369.

Professor Newman first by provisional inspection as explained on page 55. The provisional diagnosis was then reviewed in the light of the detailed examination of the palm prints and finger prints. In this review all the observations and physical measurements were taken into account, and the final diagnosis was then made.

In point three McNemar says that finger ridges "played a large part in the diagnosis." According to Professor Newman's statements on pages 64 and 92, practically all of both types of twins were diagnosed without a knowledge of the physical measures. Composite differences were also employed in diagnosing 3 doubtful cases, but this composite included height, weight, head length, and head width as well as finger ridges. I do not agree, therefore, that the latter played a sufficiently large part to warrant "drastic" modification of our conclusions. The conclusions on page 353 should be interpreted in the light of the very small number of physical and mental traits employed by us.

Some of the criticisms made are without much point. For example, in the sixth comment McNemar says that corrections for errors of measurement will raise h^2 about .10, etc. Inasmuch as I say the same thing in effect on page 119 of the book, I see no point in repeating it. It is there stated, "In other traits, such as those measured by Woodworth-Mathews tests, the unreliability is probably large, and the resulting t^2 and h^2 are doubtless much too small." I also corrected for unreliability where possible, but I am charged with making only a "feeble attempt." This sort of criticism is unfair.

In point seven McNemar counts 2 correlations as greater than 3 times their standard error. We find 7 such values. I cannot agree, therefore, with his criticism as to the significance of the correlations. He doubts the standard of significance employed by us in Table 93 and computes correlations of .52 and .63 between differences in finger ridges and differences in Binet I.Q. and Stanford E.A., respectively. We are then challenged to explain these correlations, which are 2 or 3 times their standard errors. His argument would seem to be that the 2 correlations above should be insignificant but are as significant as some in our Table 93; therefore our standard is too low.

Now it is a matter of opinion as to what standard of significance to employ. In Table 93 I employed the standard recommended by Fisher on page 121 of his text.[2] McNemar questions this standard and offers his correlations between supposedly uncorrelated differ-

[2] R. A. Fisher, *Statistical Methods for Research Workers.* (Sixth Edition.) Edinburgh: Oliver and Boyd, 1936.

ences as evidence against it. This is poor logic. There is good reason to accept Fisher's standard, but it is up to McNemar to show why his variables should really be uncorrelated before he can use such data as good evidence. Instead of his challenging us, we should challenge him.

In point eight McNemar says, " Moreover, so far as the reviewer knows, it has not been demonstrated that the distribution of means of samples drawn from such marked J-shaped distributions is near enough normal to justify the use of probable errors." I do regard the distribution of means from such J-shaped distributions of differences to be sufficiently normal to warrant the use of probable errors. In support of this contention I cite the discussion in Yule [3] where a J-shaped binomial $(.9+.1)^{20}$ is taken as an illustration. Yule shows that the distribution of means for samples of 5 is of the form $(.9+.1)^{100}$, for which he says the " divergence from symmetry is comparatively small." For samples of 20, the distribution of means should approximate a normal distribution very closely. In fact, for the more J-shaped binomial $(.95+.05)^{20}$, the distribution of means for samples of 20 will be more symmetrical than for Yule's illustration with samples of 5. Such skew binomials are not unlike our distributions of differences.

In point ten McNemar says that our resemblance correlations should have been corrected not only for age, but also for range, and he implies that failure to do so makes our conclusions vulnerable. He submits a little table in which a few of the correlations have been so corrected. He does not say how he corrects for range, but my computer has discovered that he used Kelley's formula which is given on page 254 of my text on statistics. This formula was invented for dealing with adjustments of reliability coefficients for variations in range of talent. Assuming that this formula is applicable to the adjustment of twin correlations for range, I have applied it to the correlations of Table 37, and to those of Table 96 after first correcting these coefficients for age. McNemar's criticism is confined to the effect upon resemblance correlations only, but since these were obtained mainly to determine values of h^2, I have presented here in Table I the values of h^2 from Table 37, together with those corrected for both age and range as McNemar suggests. In each case the fraternal group was taken as the standard in using Kelley's correction formula.

[3] G. Udny Yule, *An Introduction to the Theory of Statistics.* London: Charles Griffin and Company, Limited, 1919. Pp. 344–347.

If we examine the differences in the last column of Table I, they appear generally quite insignificant. We thus find 13 positive or zero differences and 10 negative differences, all small. The largest difference, .20, is for the test of arithmetical computation. The probable error for $h^2=.12$ is .20, and for $h^2=.32$ is .16. The difference, .20, is obviously insignificant, as are all the rest.

TABLE I

VALUES OF h^2 FROM CORRELATIONS

Trait	Correlations Corrected for Age and Range		h^2 from Formula (25) Corrected for Age and Range	h^2 from Table 37 of *Twins*	Difference
	I	F			
Standing height	.935	.645	.82	.81	.01
Sitting height	.875	.503	.75	.76	—.01
Weight	.923	.631	.79	.78	.01
Head length	.910	.583	.78	.78	.00
Head width	.846	.545	.66	.75	—.09
Cephalic index	.837	.579	.61	.75	—.14
Finger ridges (R)	.928	.337	.89	.86	.03
Finger ridges (L)	.947	.501	.89	.85	.04
Total finger ridges	.961	.459	.93	.90	.03
Binet Mental Age	.871	.599	.68	.65	.03
Binet I.Q.	.888	.631	.70	.68	.02
Otis score	.893	.572	.75	.77	—.02
Otis I.Q.	.919	.618	.79	.80	—.01
Stanford Achievement:					
Word meaning	.860	.563	.68	.68	.00
Arithmetic computation	.787	.688	.32	.12	.20
Nature study and science	.727	.653	.21	.34	—.13
History and literature	.810	.672	.42	.45	—.03
Spelling	.916	.732	.69	.53	.16
Educational Age	.896	.696	.66	.64	.02
Woodworth-Mathews	.536	.365	.27	.30	—.03
Tapping speed—wrist	.580	.442	.25	.27	—.02
Tapping speed—finger	.659	.377	.45	.46	—.01
Tapping speed—total	.688	.382	.50	.50	.00

The reason for the insignificance of the differences in h^2 is due largely to the fact that the trait standard deviations for both twin types are generally not significantly different, as shown in Table 28 of the text. If the reader will turn to this table he will note a significant difference for cephalic index, but not for head length or head width, which have differences in the opposite direction. He will also note a significant difference for standing height, but not for sitting height. The remaining differences may be regarded as insignificant.

Turning to the separated cases, we do find a significant difference between the trait standard deviations in Binet I.Q. for separated and

unseparated identical twins. The difference is 3.3 times its probable error. For Otis I.Q., however, the difference is only 1.8 times its probable error.

Table II gives corrected values for Table 95, as well as the original values of h^2 for single entry standard deviations. As pointed out in the first part of this reply, the differences are all negligible, but the double entry values should be used.

The formula for h^2 used in Table 95 is not the same as (25) on page 115. The formulæ are equal only if the 2 trait variances are equal. If these variances are not equal (or approximately so) the first formula may be used because it corrects for range of talent exactly as McNemar suggests. Let us show this in detail. The formula for h^2, as used in Table 95, may be written,

$$(A) \qquad h^2=\frac{{}_t\sigma_D^2-{}_1\sigma_D^2}{{}_t\sigma_D^2}$$

An exactly equivalent formula may be obtained by using equation (4) of our text to convert this into trait standard deviations and correlations. Thus we have

$$(4) \qquad \sigma_D^2=2\sigma^2(1-r)$$

and upon substitution of this value in formula (A),

$$(B) \qquad h^2=\frac{{}_t\sigma^2(1-{}_tr)-{}_1\sigma^2(1-{}_1r)}{{}_t\sigma^2(1-{}_tr)}$$

The reader will note that this reduces to formula

$$(25) \qquad h^2=\frac{{}_1r-{}_tr}{1-{}_tr}$$

in the special case when ${}_t\sigma={}_1\sigma$. This is formula (25) of our text. Kelley's formula for correcting for range of talent may be written here in the form

$$(C) \qquad {}_1r_e=\frac{{}_t\sigma^2-{}_1\sigma^2(1-{}_1r)}{{}_t\sigma^2}$$

Formula (C) corrects the value ${}_1r$ to the range of fraternal twins just as McNemar applies it in his table in the review.

Now if we assume the value ${}_1r$ in (25) to be corrected for range, that is, equal to ${}_1r_e$, then we may substitute the right-hand member of (C) for it and obtain equation (B). The values of h^2 obtained by McNemar by formula (A) should not have agreed exactly with those from Table 37, because the latter had not been corrected for range.

TABLE II

VALUES OF h^2 COMPUTED FROM VARIANCES

Trait	Double Entry Variances						h^2 from Table 95	Difference
	${}_e\sigma_D^2$	${}_1\sigma_D^2$	${}_r\sigma_D^2$	${}_e\sigma_D^2 - {}_1\sigma_D^2$ / ${}_e\sigma_D^2$	${}_1\sigma_D^2$ / ${}_r\sigma_D^2$	h^2		
Height	6.680	6.320	34.600	.05	.18	.82	.82	.00
Weight	213.000	36.200	175.000	.83	.21	.79	.79	.00
Head length	0.109	0.118	0.546	...	.22	.78	.76	.02
Head width	0.161	0.088	0.257	.45	.34	.66	.68	—.02
Binet I.Q.	111.700	53.900	177.000	.52	.30	.70	.69	.01
Otis I.Q.	100.800	39.900	189.000	.60	.21	.79	.84	—.05
Stanford Achievement	548.300	83.700	244.000	.85	.34	.66	.64	.02
Woodworth-Mathews	48.800	58.900	80.500	...	.73	.27	.15	.12

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TABLE III

CORRELATIONS CORRECTED FOR AGE AND RANGE

Trait	Number of Pairs		Correlations			Differences		
	I and F	S	I	F	S	$_{I}r-_{F}r$	$_{I}r-_{S}r$	$_{S}r-_{F}r$
Standing height	50	20	.935	.645	.933	.290	.002	.288
Weight	50	20	.923	.631	.551	.292	.372	—.080
Head length	50	20	.910	.583	.916	.327	—.006	.333
Head width	50	20	.846	.545	.716	.301	.130	.171
Binet Mental Age	50	19	.871	.599	.619	.272	.252	.020
Binet I.Q.	50	19	.888	.631	.768	.257	.120	.137
Otis I.Q.	50	19	.919	.618	.797	.301	.122	.179
Stanford Achievement	50	19	.896	.696	.324	.200	.572	—.372
Woodworth-Mathews	50	19	.536	.365	.616	.171	—.080	.251

Let us illustrate this point from the Tables I and II. The correlations used in obtaining values of h^2 based on formula (25) in Table I have been corrected for both age and range. The values of h^2 in Table II are merely from double entry variances. If the reader will look at the corresponding values of h^2 in these 2 tables he will see that they are identical. The reasons for these values being identical are, first, that allowance for difference in range has been made as explained above, and secondly, that formula (B) happens to be unaffected by correction for age.

In Table III I have given the correlations of Table 96 corrected for age and range as McNemar describes them. We disagree with his numbers only in the third decimal place. In the text I say that for measures of intelligence the correlations for separated identical twins are lower than those for unseparated cases, basing my statement on the correlations in Table 96. McNemar corrects the correlations as in Table III and says that there is no significant difference. The 3 differences in dispute are given in Table IV.

TABLE IV

DIFFERENCES BETWEEN CERTAIN IDENTICAL TWIN CORRELATIONS

Trait	${}_{i}r-{}_{s}r$ From Table 96 of Text	${}_{i}r-{}_{s}r$ From Table III (McNemar's Values)
Binet M.A.	.285	.252
Binet I.Q.	.240	.120
Otis I.Q.	.195	.122

From this table it appears that unseparated twin correlations are larger than those for the separated group with or without corrections. If we use Fisher's z-transformation, the 3 corrected differences divided by their standard errors are, in order from the top, 2.19, 1.42, and 1.76. Fisher regards a value of 2 as indicating significance, as we have done on page 98 in the text. In view of the value 2.19 and the consistency of differences, I regard McNemar's statement as incorrect.

At one point he questions the validity of the home ratings because 2 of the raters (Professor Newman and Mrs. Mitchell) were familiar with the twins and had given the measurements. I would be interested to know just how this familiarity invalidated the rating of the home. I should think all 5 raters would have made better ratings if they had been familiar not only with all twins but with their homes as well.

McNemar criticizes my analysis of younger and older twins as being clumsy and not following the precepts of my textbook. I think he has some warrant for this criticism. It does seem clumsy.

Taking the review as a whole, McNemar's points do not seem to me to show that our study is generally vulnerable. Several of his points are matters of opinion: whether or not we overlooked fraternal twins that did not look alike; whether or not finger ridges played a large rôle in diagnosis; whether or not the means of J-shaped distributions are sufficiently normal to justify the use of probable errors; whether or not our knowledge of the twins affected our rating of their home environments; and whether or not the standard of significance used in Table 93 is too low. I have presented my arguments on these points, and showed that in some cases his logic is also at fault. The remaining points have largely to do with the failure to make certain corrections in resemblance coefficients. I have attempted to show that we have corrected the values of h^2 in Table 95 in this respect, and that in Table 37 the corrections are negligible. In comparing the correlations themselves, the conclusions from corrected or uncorrected values do not differ materially, although I should admit, the corrected values would be preferable.

The work on our book was carried on over a period of nearly 10 years. Three different sets of computers were employed, and each of the 3 authors handled the data many times. Parts of the study were done independently by one author and the general summary of his results described by another in the last chapter. In the wording, therefore, it is not surprising that isolated statements could be picked which could be given a different interpretation from ours. If our only actual errors (as I see them in the review) are the computation of a single- instead of a double-entry table of standard deviations and slight arithmetical inconsistencies in Table 95 due to rescoring some of the tests, I shall feel that our painstaking efforts toward accuracy have not been in vain.

BOOK REVIEWS

GESELL, ARNOLD, and THOMPSON, HELEN (assisted by Catherine Strunk Amatruda), *The Psychology of Early Growth: Including Norms of Infant Behavior and a Method of Genetic Analysis.* New York: The Macmillan Company, 1938. Pp. ix+290.

In this book we have something which workers in the field of infant testing have long been waiting for—an accurate, detailed, and complete account of the methods of observation and measurement used in the Yale Clinic of Child Development, with norms for the first year of life. The authors state that this book is intended to replace the now out-of-print *Mental Growth of The Preschool Child,* and that its value will be enhanced if studied in conjunction with the pictorial *Atlas of Infant Behavior* to which they make frequent specific references.

Part I describes "Methods and Procedures." The norms are based on a "minimum of 24 infants (12 boys and 12 girls) . . . investigated at each of 15 age levels" from 4 through 56 weeks. A number of the children were tested repeatedly, others were tested only at longer intervals as a check on possible practice effects. "Seventy-six, or 71 per cent of the cases, were re-examined at the age of either 5 or 6 years," and available cases are now being re-examined at 10 years. The small number of children studied made it advisable to select a homogeneous sample. Their selection was accordingly based on the criteria of average economic background, American parentage of North European stock, and normal period of gestation and conditions of birth. Great care was taken to standardize certain factors in the examining situation which might, if not controlled, make for inexact results. Age was computed in lunar months from birth, and examinations were made only at the exact four-weeks intervals (never allowing more than two days variation). Except for the four-weeks-old examination in the home, the observations were made at the clinic, usually in the photographic dome. A fairly rigid order of procedure was followed, with exact methods of presenting materials. The examiner dictated to a stenographer a running account of all of the child's observed behavior during the testing situation, while at the same time motion pictures were taken. From these two sets of data

used together, the behavior norms were later derived. In addition to the behavior records the following data were secured for each child during his "Clinic Day": Anthropometric measures, physical examinations, ratings of "Behavior Individuality," and interviews with the mother about home routines and significant behavior or events in the child's life at home.

Part II is concerned with the norms derived from these records, the behavior norms being described in three different ways. In chapter VII items for each behavior situation are listed with the percentage passing each item at each age tested. In chapter VIII the responses are arranged according to levels of maturity. Here is described the characteristic behavior for each age at which the children were tested. In chapter IX the items are regrouped on the basis of "functional" capacities, into seven categories such as (1) *Specific Postural Activity,* with the subclasses "head," "arm-hand," "leg-foot," and "foot." The items are here also shown to appear in the developmental sequence in three different ways: some patterns of behavior increase in frequency with age, others decrease, while still others are "focal," *i.e.* increase for a while but then decrease and are observed in only a small proportion of the children. The authors assign a "critical age" to each item; this is the first age at which 50% of the children made an *increasing* response, at which 50% failed to make a *decreasing* response, and the age at which the greatest number of children made a *focal* response.

Anthropometric norms, chapter X, are given in tables which include at each age level, for the sexes separately, means, S.D.'s and extremes for each of ten measures, and for fifteen indices derived from these measures. Discussions of these data in relation to physical growth trends is reserved for another publication.

Part III, the "Analytic Appraisal of Growth Status," is a discussion of the nature of behavior development in infancy, and a justification, in the light of this discussion, of the authors' own method of scoring and evaluating test responses. They argue that growth in behavior is not merely a matter of adding new responses, but also of dropping out old ones, as the organization of the infant changes. A test of development should, accordingly, include items which measure both types of developmental change in order to gain a complete picture of a child's level of ability. But the authors offer no proof of their thesis by presenting norms derived from different selections of test items. Hence they are not convincing in their arguments that for test scores the method they recommend is any better than the

methods now generally used. As a matter of fact, other investigators who have worked with infant tests have noted this dropping out of immature behavior patterns, and have at times included such behavior changes in their test series. But the immature patterns are usually replaced by more advanced ones, so that a scale made up only of items whose frequency increases with age over a span of several months, actually does take into account most of these changing patterns. It seems unnecessary to include in a scale, for example, both the "decreasing" "head predominantly rotated" and the "increasing" "head predominantly midplane" (illustrated in figure 20) when the presence of the latter automatically excludes the former. There are some items, of course, where the two opposing trends are not mutually exclusive. But in the authors' own words, "In general a *decreasing . . . trend* represents obsolescing behavior which has diminishing importance in the economy of the organism. An *increasing trend* usually signifies behavior fundamental to further development . . ." In view of this statement, it seems doubtful that a test of abilities can go far wrong in emphasizing only newly developing behaviors. As the authors point out, however, it is of clinical value to note the continued presence of behavior which is immature relative to a child's general level of development, though such an immature response should not be allowed unduly to influence the child's score.

The method of scoring (chapter XII) is in some ways similar to that suggested by Thurstone, of finding the point at which the number of more difficult items passed is equal to the number of easier items failed. The authors prefer, however, only an approximate age placement of the child's performance; and the scoring is further complicated by accounting separately for increasing, decreasing, and focal items, and by obtaining a separate score for each of five functional categories—postural, prehensory, perceptual, adaptive, and language behavior. A single composite score they believe to be unjustified as an oversimplification of a complex array of behaviors. This may be true; but since they themselves say that many of the items might legitimately be placed in several of the categories, there being no way of dividing the behavior patterns into independent functional units, one might hold equally well that the separation of scores is an unjustified complication serving to indicate only approximately the general fields in which a child (at the time of a particular test) may be retarded or advanced. The use of the scores *both* separately and in combination may very well be useful when their limitations and merits are taken into consideration.

Five appendices give a variety of detailed information including record forms for use in a clinical behavior examination.

This volume has great value as a careful and thorough presentation of the Yale material. But the authors tend to ignore related studies made elsewhere, from which it is not unthinkable they might occasionally have profited. If insularity is often a symptom of genius, it is scarcely the hallmark of science.

The authors remark, in a concluding statement, that "the complex of growth is governed by inherent maturational mechanisms which carry every infant toward an optimal. These mechanisms are lawful. Herein lie the possibilities of prognosis as well as of diagnosis; for where there is lawfulness there is potential prediction." The reviewer is hopeful too, but is reminded of F. H. Bradley's comment: "It is *always* wet on half-holidays because of the Law of Raininess, but *sometimes* it is *not* wet, because of the Supplementary Law of Sunshine." At any rate, reliable predictions on the basis of infant tests appear unlikely for some time to come, not because of metaphysical guesses about the absence (or presence) of "lawfulness," but because of the accumulating empirical evidence that young children, who have been tested repeatedly over a span of years, are inconstant in their rates of growth, whatever the variable measured.

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INSTITUTE FOR JUVENILE RESEARCH (Paul L. Schroeder, Director), *Child Guidance Procedures.* New York: D. Appleton-Century Company, 1937. Pp. vii+362.

The main content of this book consists of a description of the child guidance procedures used in diagnosis at the Institute for Juvenile Research and the presentation of illustrative cases of therapy. The material selected is suited to the beginning student of behavior problems. It appears well chosen and is clearly presented. The problems range from the mild to the more extreme types. The procedures described are those rather generally followed. There is no evidence of extreme devotion to any particular technique or method, but rather a conservative attitude is maintained throughout.

Diagnosis is accomplished through various divisions of the Institute, the main aspects being (1) the social history, (2) the medical study, (3) the psychological examination, (4) the recreation study, and (5) the psychiatric interview.

The function of the social history is "to spread a wide net to catch all the factors which may have a bearing on the situation." Its primary objective is a vivid description of the difficulty. Medical examinations give an adequate understanding of misbehavior in only a small fraction of cases. Disorders which have associated with them behavior problems peculiarly serious, chronic, and refractory to treatment are discussed somewhat in detail. Of these, encephalitis, epilepsy, and syphilis receive the most extensive treatment.

The psychological examination "is concerned with the evaluation of the child's innate abilities, educational achievements, and special aptitudes," mainly through standardized tests. The tests used are described briefly. Although it is not stated which of the tests measures innate abilities, presumably the authors meant the intelligence test to fit in this category. One gets the impression that the chief merits of the intelligence test are bound up with the constancy of the I.Q. and the prediction of later ability. The time-worn statement is reiterated that the probable error of an I.Q. is five points. One wonders what use the Institute workers would find for intelligence tests if the above legs should fold up under them, as recent researches indicate they may. The statements made in regard to intelligence tests are such as might have been made ten years ago, without qualification or reservation or hint to the reader of differing points of view.

A recreation interview, developed at the Institute, is an integral part of the clinical examination. The purpose of the interview is to secure information on the way the child spends his leisure time and his attitude toward various recreational activities and persons related to his play.

The special contribution of the psychiatric interview is "the discovery and elucidation of the child's inner motives as these are revealed by his behavior." The child is encouraged to give his own account of his attitudes, conflicts, and other inner motives. "There are no standardized methods or techniques in the psychiatric interview." Psychoanalysis as a therapy method is used sparingly and in a modified form.

Part III of the book is devoted to illustrative cases of therapy, under the general headings of problems arising from interference with the child's opportunity to grow, from failure to support the child's dependency, from failure of proper direction, training, or control, and from constitutional inadequacy. Nearly half of the pages are taken up by these illustrations.

Part IV consists of a few pages on "The Clinic and the Community." Part V, also brief, is entitled "Perspective." In this chapter one discovers that the "*raison d'être* of the child guidance clinic is the blazing of a trail and the setting of a standard." Again, "It must be a center of training, of study, of research, of exchange in ideas" and "As rapidly as new insights or new techniques are developed in the clinic they should be passed on to the other organizations capable of applying them." This is the first hint given of these objectives. If the reader tries to relate these statements to the previous content of the book, such questions as the following arise. How do the procedures described contribute to the blazing of a trail? How do diagnosis and the application of standardized procedures fit into a research program, or vice versa? How are new techniques developed? In the main content there is no indication that the authors had any objective in mind other than the adequate diagnosis and treatment of the individual by the best of available commonly accepted techniques. A standardized intelligence test, for example, is applied in order to find out the intelligence of a child in question. If the psychologist intended other values to emerge from the examination, such intention is not apparent. To the reviewer, who was unable to bridge the gap, this chapter has little relevance to the other chapters. It appears to be addressed to a different audience, to serve a different purpose, and to be an afterthought.

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DEXTER, E. S., and OMWAKE, K. T., *An Introduction to the Fields of Psychology*. New York: Prentice-Hall, Inc., 1938. Pp. xi+236.

This brief orientation for the beginning student is clearly and interestingly written, yet the authors have not yielded to superficiality. Their presentation of the history, the schools, and the various fields of psychology is, on the whole, such as to create respect for and interest in scientific psychology.

The two initial chapters are largely epitomes of material such as that in Boring's *History of Experimental Psychology* and Woodworth's *Contemporary Schools of Psychology*. However, Cattell is cited as exemplifying the Wundtian influence in American psychology. Titchener is mentioned later, but only in connection with existentialism as a school. The peculiar receptiveness of American

psychologists to imported systems is stressed. We "accept with docility almost any innovation tagged with a foreign name." Only behaviorism is distinctly American and even that "was not a distinct and vital system until after Lashley had incorporated in it the conditioned-reflex mechanism from Russia."

Least routine of the remaining chapters is that which deals with pseudopsychology and parapsychology. The authors are undecided as to whether or not current parapsychology is pseudopsychology. Nevertheless, both subjects are presented in a single chapter. After palmistry, phrenology, and certain aspects of graphology and characterology are debunked, consideration is given to such parapsychological phenomena as dowsing, clairvoyance, and mental telepathy. Rhine's research is analyzed briefly and possible explanations of his results considered. "There is," according to the writers, "still serious question whether, if coincidence is ruled out, telepathy and clairvoyance actually exist other than in the practices of quacks and charlatans, and in the imaginations of honest people possibly subject to hallucinations." It is suggested, however, that there may be "some connection between 'brain waves' and subliminal stimulation or extrasensory perception."

In the chapters on medical and abnormal psychology, one finds no mention of fever and high-frequency treatment for paresis and of insulin treatment for schizophrenia, although both maladies are considered in some detail. Except for such omissions, these chapters are excellent.

The poorest discussion in the book is that concerning social psychology. In the reviewer's opinion it would have been much more interesting had the topic been treated historically, showing the trend from folk psychology to individual social psychology, with McDougall's epoch-making *Social Psychology* doing much to turn the tide. All that one finds is a rather trite discussion of suggestion, propaganda, public opinion, the audience, and so on. The uninitiated reader of this chapter may conclude that social psychologists are satisfied to utilize sociological data without themselves contributing. Not a single psychological experiment is discussed. Allport, Dashiell, Thurstone, and other psychologists who have contributed important research, are not mentioned. Hitler, Mussolini, and Coughlin are alone referred to. It is surprising, by the way, to read on page ninety-eight that language is a *native* tendency.

Psychological contributions to law, advertising, and efficiency are presented in an exceedingly able manner. The choice of illustrative

material is especially good. In general, child psychology is given a sufficiently adequate treatment for the present purpose. A brief historical introduction is followed by a sketch of some of the more important developmental trends. However, in an otherwise objective presentation the following statement seems glaringly inappropriate: "The child does have sensations before birth, but it is not known with certainty of exactly what sensations the human foetus is capable."

Although the chapter on animal psychology covers such important topics as motivation, learning, and sensory discrimination, there is a very inadequate treatment of higher processes. Consideration of delayed reaction and double alternation in the temporal maze would have added greatly to the value and general interest of this chapter. Moreover, one must question the statement that "the scientific stage of animal psychology may be said to date from Thorndike's studies." No mention is made of the pioneer researches of Lubbock. Furthermore, Small's maze studies with the rat are erroneously reported as having been carried out in 1890, eight years before Thorndike's "pioneer" work. The final chapters concern psychological measurement and experimentation.

Despite the above-mentioned shortcomings, this book will prove valuable either as an introduction to the course in general psychology or as a concluding orientation. A short list of references appears at the end of each chapter. There is a good index.

NORMAN L. MUNN.

Vanderbilt University.

JOUSSAIN, ANDRÉ, *Psychologie des masses.* Paris: Ernest Flammarion, 1937. Pp. 212.

This book bears a general resemblance to Le Bon's classic, *The Crowd,* which it apparently is intended to supplement. The treatment is similarly reflective and deductive. But the principles are on the whole nearer to modern scientific psychology, and the analyses are less superficial and more discerning. The author's procedure is to state briefly certain psychological principles (mostly of a common sense sort) and then to show how they apply to crowds and, more especially, to masses. He defines a crowd as "a certain number of *assembled* individuals animated by a common feeling or desire," and a mass as "a large number of individuals scattered in space but placed in certain respects in similar conditions and susceptible of being

animated by a common feeling or desire." Masses are grouped in the following categories: peoples (insofar as they have common beliefs or emotions), classes and castes, members of the same trade or profession, sects, categories of sellers and lawyers, and coteries (military, academic, etc.). One recognizes here the secondary or derivative groups of the sociologist and wonders whether they are all properly called masses. Unfortunately, the term mass is not yet clearly defined in sociological thinking.

Masses and crowds, says Joussain, are closely related and possess certain features in common. Both are made up of individuals having a certain community of convictions, desires, or aspirations, and reacting continually one upon another by reason of this community and of the similarity of conditions in which they are placed; both possess emotionality, suggestibility, and "an aptitude to be hypnotized by an idea." But the mass possesses certain distinctions resulting from the dispersion of its members: it is less mobile, less vigorous in behavior, and slower to change than the crowd. These distinctions arise from the fact that the contagion of sentiment and ideas is direct in the crowd, whereas it is subject to interruptions and antagonisms in the mass.

Joussain evidently recognizes the importance of individual mental equipment in determining the nature of collective behavior, although, concentrating as he does on the general pattern or Gestalt of crowds and masses, he tends to neglect the variability which individual differences must introduce into collective phenomena. There are, he says, three sets of psychological conditions which the individual brings into collective situations. There are those "tendencies common to all men, which result from organic constitution and heredity"; among these are the instincts, such as "sex, attack and defense, prehension and destruction." (He seems to be unfamiliar with present American thought on the instinct problem.) There are those tendencies the preponderance of which constitutes the character and mentality proper to a people; by this he means the "inveterate sentiments," "mental dispositions," and "habits of mind contracted in the course of a long history." And there are those tendencies, aspirations, and passions of the class or social category to which belong a majority of those who make up a crowd. All of these affect the pattern of collective action. But how, psychologically, this collective effect is brought about Joussain does not make clear. However, he does make the point that "the psychological laws which govern individuals in the crowd are the same as those which control every one of them out of

it; the application only is different by reason of the special conditions created by the unison."

There are chapters on the beliefs, the logic, the desires, the reactions, the intelligence and morality, and the leadership of crowds; and there are two final chapters, pessimistic in tone, on the preponderance and the social effects of masses at the present time. The burden of most of the discussion is that masses (and crowds) are incapable of complex thoughts or acts, are credulous, mystical, suggestible and intolerant, and are ordinarily low in intelligence and morality; because in the collective situation the individuals are no longer "free," and freedom is necessary to intelligent, logical, critical, highly moral thought or action.

Psychologists interested in the phenomena of collective behavior will find this volume stimulating and suggestive. The author's contribution lies not so much in the formulation of new concepts as in the extension of their application to social events. One feels that the work would have been improved by more analysis and development of the psychological principles involved. Joussain's statements of basic processes are often so brief or general and his conceptual transitions so swift as to leave the reader who is primarily concerned with psychological functions either puzzled or dissatisfied. For example, the "gregarious spirit" is said to result from a modification of the "gregarious instinct" through the operation of reflexion and language; but the psychological nature of this process is not indicated. It is evident throughout the book that sociological interests predominate over psychological interests, and this may have been largely the reason for the striking absence of references to relevant data of present-day genetic and experimental psychology.

HERBERT GURNEE.

Western Reserve University.

THOMAS, WILLIAM I., *Primitive Behavior: An Introduction to the Social Sciences.* New York: McGraw-Hill Book Company, Inc., 1937. Pp. ix+847.

Here within the covers of one volume is a whole library of material with which to illustrate how differently human beings can perceive relatively similar situations, and how these different perceptions work out into different patterns of social customs, laws, forms of government, and the like. It is not presented as a source book, but that is practically what it is because so large a proportion of these

pages are used for the presentation of extensive selections from authoritative sources concerning the behavior of primitive peoples. Of theory there is not much, not enough perhaps to suit many readers. The effort is admittedly to set forth examples of primitive behavior in order that the reader may observe for himself the "varieties of human response to the stimuli of various cultural situations." Some readers may be disappointed by the omission of the economic and artistic factors of behavior, but in the face of the vast amount of material which the author succeeded in cramming into these pages it would scarcely seem reasonable or courteous to mention omissions. Some of the famously controversial positions the author lightly avoids. He thinks that special cultural patterns may have arisen in various situations, at various times, and in different places. Then from these, if circumstances permitted, there was spread to other peoples. Of this there are some especially good studies in the chapters on language, the alphabet, and the spread of the use of a certain kind of an animal trap.

The more careful student and scholar will value the excellent bibliographies. These cover thirty-five pages of the volume and include hundreds of titles. Some of these are in foreign languages but by far the most of them are in English and are largely selected for their accessibility. Good author and subject indexes add still further to the usefulness of the material here brought together.

It must be obvious that there is much in the volume to interest the psychologist. Here excellent illustrations for lecture purposes and material for class reference may be had for work in social psychology especially. On the problem of race differences, however, the trained psychologist may not be so well pleased. There is a chapter on the relative mental endowment of races, but material from the experimental studies by psychologists on race differences is notably missing. Of this work nothing appears aside from a summary of differences in sensory acuity taken from a publication of Woodworth's in 1910.

EDMUND S. CONKLIN.

Indiana University.

GRUENDER, HUBERT, *Problems of Psychology: A Text for Undergraduates.* Milwaukee: The Bruce Publishing Company, 1937. Pp. xi+209.

This is a text designed for Catholic colleges, and, as the publishers state, is "A course for college students on Man's Rational

Life. Recommended for the second semester to follow the course on Sensitive Life." The entire contents of this text are different from those of various beginning texts which are not written from any special religious point of view. It is almost entirely philosophical, although the writer evidently has close familiarity with the ancients, the British Empirical school, and with the German developments which led to structuralism. Practically the only experiments cited are those of an introspective character, especially dealing with the thought processes, such as the Würzburg school. Proof is by reasoning; no statistical evidence whatsoever is presented.

A good share of the text is devoted to proving the existence of freedom of the will and to answering objections against this concept. It is organized in catechistical style, with statements followed by major or minor proofs or disproofs. In chapter IV, 40 difficulties against free will are refuted one by one.

The last chapter, "The Localization of Thought and the Spirituality of the Human Soul," is of greatest interest to the average psychologist. Here the author discusses localization of various functions and areas and the effects of destruction. From the lack of strict localization and the uncertainty of effects of given destruction he arrives at the conclusion that mind and body cannot be perfectly correlated and hence freedom of will is again demonstrated. Neurology, especially on aphasia, seems a little oversimplified and not completely up to date (*e.g.* Head).

RICHARD W. HUSBAND.

The University of Wisconsin.

REED, H. B., *Psychology of Elementary School Subjects.* (Revised Edition.) Boston: Ginn and Company, 1938. Pp. xi+582.

This revised edition of a popular text for teachers has been necessitated by recent findings in educational research relating to the elementary school subjects. This new edition is similar to the first in its systematic, logical organization and presentation of the significant facts related to learning in the various subject-matter fields. The book contains preliminary chapters on organization of learning, practice, and motivation. These are followed in turn by a discussion of objectives and aims, motivation, and materials, organization and practice, as well as the facts relating to individual differences for the subjects of reading, language, spelling, handwriting, arithmetic, social studies, geography, elementary science, health, and physical

education. The author has summarized under each heading the contributions and discoveries resulting from scientific investigation. The practical applications of these findings are demonstrated in connection with each separate subject. A valuable feature is the inclusion of data on individual differences in each field and the facts that are known about sequential development in learning such skills as reading, arithmetic, spelling, and language. The author's treatment of arithmetic is especially thoroughgoing and consistent. The author impresses one as being more up-to-date and better informed in this field than in others. The reader will welcome in a book of this kind the chapter on science instruction in the elementary school. Each chapter is concluded with effective summaries and selected bibliographies. The book is well documented with a careful selection of the most pertinent research references. The indexing has been particularly thorough.

For all its apparent up-to-dateness, this new revised edition suggests a refurbishing of the old, rather than a presentation and interpretation of the new in elementary education. The author's emphasis on "making the subjects meaningful" reflects the narrower, old-fashioned point of view. There is too much emphasis on subjects as subjects, rather than as truly significant learning experiences for children. The book impresses the more progressive educator as formal, stereotyped, limited in its point of view. The newer creative, integrated trend in elementary education is not presented. We do not obtain a picture of the child functioning fully in an educative situation. The slight gestures toward progressiveness are only half-hearted compromises which do not approach the fundamental issues. Furthermore, the author is content to cite old studies rather than to propose new ideas and experiments. Too much analysis is given to issues that are now considered obsolete in educational practice. There is comparatively little of the newer functional approach to teaching, as for example, in the field of spelling. There is little also on the purposes of reading and developing reading through the activity curriculum. The handwriting section raises questions on points long outmoded and comparatively little attention is given to modern trends in handwriting as such. The health section, too, seems inadequate, for little emphasis is given to practical experiments in teaching health to children through functional projects. The book omits entirely the treatment of such subjects as fine arts, household and industrial arts. Furthermore, the author does not clearly differentiate for the reader between the school subjects which are

known as "skills" and the school subjects which embrace content fields. Although the book contains a wealth of helpful information, these limitations are too obvious to be overlooked.

GERTRUDE HILDRETH.

Lincoln School of Teachers College.

MARSTON, W. M., *The Lie Detector Test.* New York: Richard R. Smith, 1938. Pp. 179.

While constituting a useful discussion to put in the hands of the interested layman, this book carries little new information for the professional psychologist. Several pages are given over to tracing "the high cost of lying from the first successful lie detection at the dawn of human history to the discovery of the blood-pressure test for deception in the Harvard Psychological Laboratory A.D. 1915." We are told that "God's method [of detecting Adam and Eve's theft of the fruit] was wholly scientific," and that "the false pretensions . . . which every normal person now indulges in may be cut off completely by the lie detector method." One looks in vain for a compilation of experimental facts to support this profound enthusiasm; and the obvious point is not made that one essential condition of success in lie detecting is a feeling on the part of the man being examined that something highly personal is at stake. The history of the test is recounted, beginning with the author's discovery of systolic blood-pressure changes as a criterion of deception in laboratory situations through Larson's application of the method to police work in Berkeley and Keeler's work in Chicago. The first admission of expressive changes induced under questioning as evidence in the courts of law occurred in 1924 in Indianapolis. The lie detector, a commercial term given to a compact assembly of sphygmomanometer, pneumograph, and accessory equipment, is now used in over one hundred police departments, mostly as an aid to obtaining confessions of guilt. Some of the legal difficulties yet encountered are discussed in connection with Marston's unsuccessful attempt to use his test in the Lindbergh kidnapping case. The author sees such barriers breaking down with time and predicts the adoption of the lie detector in many other fields. Certain business heads now receive a ten per cent reduction on bonding fee when employees are given the test every five years. Marston argues that such systematic checks will not upset an organization's morale and states that in his private practice many individuals are "turning to it [the lie detector]

for aid in love affairs and in the home . . . marriage might no longer be a case of 'let the buyer beware.'" An especially fertile field of the future is "in making personality adjustments and in detecting emotional conflicts." The last chapter deals with practical suggestions on lie detection technique and is the most valuable part of the book. For the rest about the most one might expect is a popular epidemic of lie detecting. The reviewer does not share the author's hopes that a universal desire to know if "one's present honesty standing would pass muster scientifically" would result in "a new morality . . . one of the hardest of hard-boiled requirements of living." He can understand, however, how widespread acceptance of the oft-repeated suggestion that the lie detector test is always successful would markedly increase its practical usefulness. On such grounds alone professional psychologists might give the book a certain blessing.

G. L. FREEMAN.

Northwestern University.

CHAPPELL, MATTHEW N., *In the Name of Common Sense.* New York: The Macmillan Company, 1938. Pp. 192.

This adds another to the rapidly growing list of books dealing with the treatment of psychoneuroses from the viewpoint of ordinary psychological methodology. Chappell does not address his presentation either to physicians, psychologists, or scientists, but rather to the patient who is not psychologically sophisticated. He puts forth a method of dealing with such minor mental aberrations as worry, anxiety, fear, compulsion, etc.

The essential core of the book is contained in 39 pages which constitute the chapters entitled "The Means for Correction," and "Some Practice Procedures." Essentially Dr. Chappell presents the thesis that most minor mental aberrations are forms of emotional reaction which have been learned, which follow the usual laws of learning, and which may be dissipated by the usual process of forgetting. The mentally disturbed individual is advised to arrive at his objectives by the following principles: (1) Happiness and satisfaction are to be acquired by personal practice. (2) Emotions are in part initiated by external circumstances some of which may be changed, others of which cannot be. (3) Worry, anxiety, self-pity, and sorrow are to be overcome by avoidance, both through personal preoccupation in more healthy thoughts and by discouraging others

from calling attention to the disturbing processes. (4) Active striving towards more pleasant relations with others is to be attempted. (5) Self-confidence is to be built up by thinking in terms of, " I can, with a little practice," rather than " I can't."

The bulk of the book is constituted of case histories and descriptions of the various forms of neurotic disability, together with examples of patients who have been successful in using the methods which Dr. Chappell advocates. In general the entire tone of the book is one of positive reassurance together with suggestions for active therapeutic results. The treatise seems to the reviewer to meet the objective to which it is directed.

The title of the book leaves much to be desired on the score of the description of the contents, the gaining of the attention of the proper audience, and exactitude.

CARNEY LANDIS.

Columbia University.

MASON, EDWARD C., *Why We Do It: An Elementary Discussion of Human Conduct and Related Physiology.* St. Louis: The C. V. Mosby Company, 1937. Pp. 177.

This small book represents a valiant attempt to reduce to simple form some of the involved concepts of modern psychology, physiology, endocrinology, sociology, and psychiatry. The author begins with the assumption that there are three fundamental drives behind human behavior—ego, sex, and herd instincts—which guide the individual to normal development or which lead to a neurosis when frustrated.

Under ego development are discussed psychoanalytic defense mechanisms, the endocrine glands, and the functioning of the autonomic nervous system. Failures in ego development are illustrated by an elaborate discussion of the conduct of the religious fanatic.

The discussion of the sex urge is rather brief. After showing that sex determination is dependent upon biological chance, the author centers his discussion around antagonisms between the male and the female.

The section on the herd impulse includes a chapter on abnormal psychology, an outline of various abnormal types of personalities, a brief discussion of the nature of insanity, and a chapter on mental hygiene.

The book was not written for the professional man and it is

probably too elementary and sketchy for the student of psychology or of medicine to derive much benefit from reading it. It is apparently directed toward those laymen whose conception of human behavior is still somewhat primitive. It aims to get such a person to think in physiological and mechanistic terms. This purpose is probably well expressed in the following passage: "Psychology has surrendered its soul to theology, has lost its mind to metaphysics, has been knocked unconscious by science, and has now come to physiology to interpret its behavior. With this transition, the term psychology has lost its significance and probably should be discarded. In its place, one might substitute 'behaviorology' or a study of behavior."

JOHN J. B. MORGAN.

Northwestern University.

OLIVIERI, GUIDO, *Psicologia delle abitudini.* Milano: Fratelli Bocca, 1937. Pp. ii+113.

This volume entitled *Psychology of Habits* is number 420 in a series of small popular books on modern science. Appraising it from this standpoint, it constitutes an excellent summary of psychological principles for the lay reader.

For Olivieri, habits consist of tendencies for all mental processes, motor action, and affections to maintain and repeat themselves. Accordingly, the psychology of habit comprises the whole field of psychological phenomena, not excluding the subconscious, association, intuition, and even free will.

The viewpoint of the author is pure psychism. Whether or not Olivieri's exposition might appeal to American lay readers, it stands in striking contrast to the almost universal inclination of American psychologists to couch their descriptions in terms of human behavior.

J. R. KANTOR.

Indiana University.

DE HOVRE, F., and BRECKX, L., *Les maitres de la pedagogie contemporaine.* Bruges: Charles Beyaert, 1937. Pp. 590.

It was an excellent idea to compile a biographical anthology of the world's leading educators, but we should have been more beholden to the two Belgian professors, if they had carried out this project according to a definite plan or system.

The book consists of short biographical sketches and portraits of 23 American, 55 German, 20 English-speaking, 31 French, Swiss, and Belgian, 12 Dutch, and 2 Italian educators, together with a brief evaluation of each and extracts from the works of most of them. It is not easy to ascertain on what basis the selection was made, even if pedagogy is to be understood in the broadest possible sense. Primarily we should expect the inclusion of teachers in the field of education or those who have significantly influenced education, but we find education, psychology, and philosophy almost equally represented, and a few others as well, *e.g.* an essayist like Saitschick, an esthete like Amiel, a man of letters like Chesterton, and even a graphologist (Saudek), not to mention Kidd the sociologist and Darwin the naturalist; yes, even General Baden-Powell. Nor is it easy to understand the order in which the sketches appear: although it is apparently intended to be alphabetical, Bode precedes Baldwin, and Cooper follows Dewey; James precedes Hall, and Roback follows Watson.

As to the process of selection, although a good deal may be said in its favor, there are serious omissions. In the United States we miss Titchener and Münsterberg, who at all events have brought up a generation of educators; and of the German-bred psychologists we miss Köhler and Wertheimer, the pioneers of the Gestalt movement, although their American disciples Ogden and Wheeler are included. There are a few names that might have been eliminated, but there are far more that should have been added.

The word " contemporaine " must have been taken in an unusually broad sense to include the names of Kant, Fichte, and Hegel. To be sure it is hard to draw the line, but in that case some other temporal adjective might have been used, and perhaps Rousseau could have squeezed in under that rubric. Possibly the period should have started with his times.

In the matter of excerpts, we have still more to complain of. The gleanings in some cases may have been supplied by the subject of the sketch or an efficient secretary, and where we find no extracts in connection with a sketch, the reason may have been that the compilers were not disposed to add to their burdensome task and hunt for suitable passages, but by this token, the anthology suffers and the selections appear to have been done on a casual basis. An inexperienced reader will probably conclude that only the important educators are quoted, but we find no extracts from Wundt, Nietzsche, Kant, Froebel, Hegel, or Spencer. On the other hand, we may be surprised

to come across a whole page or more of passages from the mediocre work of an American psychologist.

To some extent, this criticism has been forestalled in the preface where the authors explain that the works of celebrities are within the reach of everybody and therefore need not be quoted. Our rejoinder is that for the purpose of comprehensiveness and consistency, the highlights of, say, Spencer's *Education*, or Fichte's *Vocation of Man* should have been brought out, and it would not necessarily have taken too much space if properly condensed.

The chief puzzle about this book, however, is the geographical scope of the work. Even Italy, though it has been given a place here, fared poorly with its two representatives. What about Rosmini and his kindred spirit of the present century, Gentile, even if we choose to disregard Croce as an influence in educational development? The Scandinavian countries, with men like Höffding and Kierkegaard, are entirely omitted, as is Russia. Surely these and other countries have had their pedagogical leaders, Francisco Ferrer in Spain, for instance, whom we cannot afford to overlook. I should suggest too that Albert Schweitzer, who by dint of his example, moral initiative, and extraordinary versatility has earned the title not alone of a great teacher, but also of a great man, be recognized in a work of this sort. Among the dozen sketches of Dutch educators, most of whom are unknown to outsiders, there is a decided lacuna in that no reference is made to the most distinguished of contemporary Dutch philosophers and psychologists, the late Gerardus Heymans. Perhaps another volume should be devoted to these.

In contrast with the attitude of most of the European educators toward Americans, the considerable allotment of space to the United States is an encouraging sign, indicative of the growing regard not only for American financial status but for her scientific and literary standing as well.

Lest there be some misunderstanding, it may be said that the work of Dr. De Hovre and Dr. Breckx is an almost indispensable reference work. To have sketches and portraits of some 140 educators, many of whose faces were unfamiliar to us, is in itself a boon for which we ought to be grateful. Particularly do we appreciate the catholicity of the two authors, catholicity in a double sense. It is well that more than a proportionate number of prelates and Roman Catholic teachers have been included. They are so often neglected in our surveys. It is apparent from their evaluations that the com-

pilers themselves are closely affiliated with the Roman Catholic Church, but they do not show evidence of being prejudiced.

The general preface, as well as the individual introductions presenting a view of the separate country and outlook of their peoples, is illuminating. The American scene, for example, is covered by such captions as "tendency toward supremacy," "a people of pioneers," "optimism," "democracy," "melting-pot of nations," "pragmatism," "efficiency," "standardization," "pedagogism and psychologism," and "mutilation of the true philosophy of education."

The book will scarcely be much sought after in Germany, if it is not altogether banned, because of the courageous application of Eucken's words, "Bismarck has made Germany greater and the Germans smaller," to Hitler.

There are few typographical errors in this work, judging by European standards, but some of the slips are curious. Bertrand Russell appears mostly as Russel, only once as Russell. His name is also gallicized into Roussel, while Jacks, the editor of the *Hibbert Journal*, is Belgianized into Jackx. Among the French names, Liébault should be spelled Liébeault. Clark University appears once in a heading as Worcester University (p. 81).

It is my hope that the whole edition of the book under review will be exhausted in a short time and that the second edition will see a revision on a large scale which will make the work a compendium of great importance both as a biographical vade mecum and pedagogical source book.

A. A. Roback.

Cambridge, Massachusetts.

Crafts, Leland W., Schneirla, Theodore C., Robinson, Elsa E., and Gilbert, Ralph W., *Recent Experiments in Psychology.* New York: McGraw-Hill Book Company, 1938. Pp. xiv+417.

This book presents for the college student "and the general reader" a collection of experimental studies which have been rewritten, integrated, and discussed by the authors. In the opinion of the reviewer, its two main uses are as a second book to supplement a textbook in courses in general psychology and as a substitute for the reading of original periodical references for students of experimental psychology. There are 28 chapters covering most of the orthodox psychological topics. Each chapter (with the exception of two) is a simplified abstract of one or more experiments which the authors

consider important and representative. The chapters begin with an introductory section designed to orient the student and end with a concluding discussion which summarizes and evaluates the points brought out. The authors have adhered rigorously to experimental form, and have been careful to label the problem, method, and results of each investigation presented.

In view of the fact that *Recent Experiments in Psychology* is the collaborative work of four authors, the style is surprisingly uniform and easy to read. The book has little of the disjointed, hodgepodge effect usually found in collections of readings quoted verbatim from original sources. There are, nevertheless, obvious differences in the manner of presenting the material which are no doubt due in part to the separate contributions of the different authors. The effort to simplify the terminology is much more apparent in some chapters than in others. An example of the use of superfluous technical language can be found in chapter XII ("Organic Nervous Diseases in Relation to Behavior"), which contains the following medical terms: poliomyelitis, tabes dorsalis, tabetic cuirass, diplopia, ptosis, Romberg's sign, syringomyelia, syrinx, Brown-Séquard sensory disturbance, hemiplegia, spastic, meningitis, Kernig's sign, Brudzinski's sign, meningococcus, tubercle bacillus, diplococcus of Weichselbaum, streptococcic. The advisability or necessity of including such terms at all in a book which is designed for persons who are neither specialists in medicine nor abnormal psychology is a matter of some doubt.

Probably the most difficult task in writing a volume of this sort is the problem of selecting from a vast psychological literature the relatively small number of experiments which are to be included. One supposes that the final choice is in part a compromise between the different authors. The fields in which some of them have specialized come in for particular emphasis. With minor exceptions, however, the selection is conservative and well balanced. The book does have a physiological bias, which will be interpreted as "behavioristic" in some quarters. Yet it is a question whether this bias is due more to the references chosen by the authors or to the general trend in experimental psychology itself.

Among the obvious weaknesses or omissions are an adequate discussion of the feebleminded, child and developmental psychology, intelligence testing, and statistics. An item of some surprise is the fact that many of the great names in psychology are missing, although they could easily have been referred to in the introductory and discussion sections of the appropriate chapters. No stand whatever is

taken with reference to ESP, which also remains unmentioned. Unusual and bizarre inclusions, on the other hand, are a chapter on hypnosis, another on lightning calculators, one on graphology, and a chapter made up largely of specialized anthropological studies of Indian tribes which could well have been omitted. Although there is little reference to ontogenetic development, the phylogenetic aspects of psychology are well represented. There are excellent chapters on migration, an analysis of maze learning in rats, and a study of the rat-killing instinct in cats.

On the whole, the present writer is favorably impressed and feels that the book will be well received.

W. N. KELLOGG.

Indiana University.

O'CONNELL, GEOFFREY, *Naturalism in American Education*. New York: Benziger Bros., 1938. Pp. xxvi+285.

This book, bearing the imprimatur of the Archbishop of Baltimore, makes a sweeping attack upon all modern educational and ethical theories which are "naturalistic," *i.e.* not supernaturalistic, particularly those of Dewey, Kilpatrick, Rugg, and Thorndike. Its denunciation is extended to everything in modern science, philosophy, and education which opposes or disregards the tenets of medieval scholasticism. The assumptions underlying the argument are those of dualistic metaphysics, embodied in an ethical and theistic system, supernaturally revealed. Such premises, of course, are not assumed to require any argument, evidence, or proof, either of their value or their truth. They are hardly even stated; they are axiomatic. The arguments which rest on these major premises are of the traditional scholastic type, documented by many citations from the authors discussed, and from their expositors and critics. These arguments culminate in conclusions whose general purport is that the author being criticized is incontrovertibly proved to be a naturalist, a positivist, a materialist, an evolutionist, anti-Christian, atheistic—or all.

This characterization will perhaps suffice to indicate the nature, purpose, and value of the book. It belongs definitely to the literature of polemics, not of science.

To read such a book as this, once a year, would probably be a salutary experience, even if not a particularly gratifying one, for any scientist or educator who complacently assumes that three centuries

of warfare against traditionalism, dogmatism, and supernaturalism have ended in a conclusive victory for science. He would perhaps be disturbed by the reminder that the ancient adversary not only denies that he has been vanquished, but is as completely assured as ever of his own rightness, as well as of his moral duty to reopen the conflict and wage relentless warfare upon all science which does not rest upon the postulates of scholastic metaphysics.

F. A. KINGSBURY.

The University of Chicago.

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NOTES AND NEWS

Dr. Harry Miles Johnson, research associate of the National Research Council, has been appointed professor and head of the department of psychology in the College of Arts and Sciences at Tulane University. Dr. Johnson will succeed Dr. John M. Fletcher, who will retire at the close of the current session.

Dr. Elmer Culler of the University of Illinois has been appointed professor of psychology and director of the psychological laboratories at the University of Rochester to succeed Dr. Leonard Carmichael.

Dr. Kurt Goldstein, head of the Neurophysiological Laboratories at the Montefiore Hospital and clinical professor of neurology at Columbia University, has been appointed William James Lecturer in Philosophy and Psychology at Harvard University for the first semester of the academic year 1938–1939; Dr. Kurt Lewin, professor of child psychology at the University of Iowa, has been appointed lecturer on dynamic psychology at the Harvard Psychological Clinic for the second semester; and Dr. S. Smith Stevens has been promoted to be assistant professor of psychology in the Harvard Psychological Laboratory.

Dr. William A. Hunt, research associate in psychology at the Neuro-Psychiatric Institute of the Hartford Retreat, has accepted an appointment as associate professor of psychology at Wheaton College.

Dean George D. Stoddard, of the Graduate College of the State University of Iowa, has been made head of the department of psychology. He also is director of the Iowa Child Welfare Research Station.—*Science.*

Dr. George Kreezer, research associate in the department of research of The Training School at Vineland, New Jersey, has been appointed assistant professor of psychology at Cornell University.

DR. ROGERS M. BELLOWS, now supervisor of the Worker Analysis Section, Division of Standards and Research, U. S. Employment Service, Baltimore, Maryland, has been appointed assistant professor of psychology at the University of Maryland. He will join the staff of that department in September and, in addition to teaching, will supervise the setting up of a psychological testing bureau for students.

DR. SIGMUND FREUD, founder of psychoanalysis, who is now eighty-two years of age, has left Vienna and has gone to London. According to press reports, Dr. Freud was allowed to take his manuscripts with him, but his other property has been confiscated.

—*Science.*

AT THE meeting of the Washington-Baltimore Branch of the American Psychological Association on May 6, the following officers were elected for 1938–1939: Dr. Max Meenes, Howard University, president; Dr. Sidney M. Newhall, Johns Hopkins University, vice-president; Dr. Steuart Henderson Britt, George Washington University, secretary; Miss Mildred S. Percy, District of Columbia Public Schools, treasurer. Papers were presented by Dr. J. Edward Rauth, Catholic University, on *Personality Inventory for Grade School Children;* Mr. Patrick Toomey, Catholic University, on *Relations of Reaction Time to Color Preference;* and Dr. H. M. Johnson, Highway Research Board, on *Methods of Detecting Accident-prone Drivers.*

THE SOCIAL SCIENCE RESEARCH COUNCIL has announced the award of seventy-one grants, totaling more than $85,000, for 1938–1939. Among those who will receive research grants-in-aid are Wayne Dennis, associate professor of psychology, Clark University, for a study of child care among the Hopi and Rio Grande Pueblos; Elaine F. Kinder, research psychologist, Letchworth Village, for a follow-up study of social adjustment of one hundred delinquent girls; Abraham Harold Maslow, instructor in psychology, Brooklyn College, for a study of primitive personality with special reference to dominance-feeling and ego-security; Theodore M. Newcomb, instructor in psychology, Bennington College, for a study of personality concomitants of attitude changes of undergraduates over a period of years in one college; Saul Rosenzweig, psychologist, Worcester State Hospital, for a study of the validation and standardization of an

optionary on types of reaction to frustration; Stevenson Smith, professor of psychology, University of Washington, for a study of the comparison of racial samples in Honolulu in 1924 and 1938; and Herbert Fletcher Wright, instructor in psychology and education, Carleton College, for a study of the influence of goal-distance and route-security upon strength of motivation. Among those who will receive post-doctoral research training fellowships is Weston la Barre, Ph.D. Yale University, for study in the United States of clinical psychiatry from the point of view of a cultural anthropologist.